

At this point in your studies you should have been introduced to the *limit*, the *derivative* and the *integral*. These are the cornerstones of calculus. The goal of this assignment is to explore the extent to which any one of these concepts can live without the others.

Here is the set-up: Imagine you are teaching a class on calculus to a group of very bright history majors. These students are well-versed in pre-calculus, however calculus is new to them. Since they are history majors, it is not necessary for them to know how to compute and solve problems as well as, say, an engineering major would; they are only taking your class to obtain an appreciation for some or all of calculus. Unfortunately, due to a time constraint you cannot teach them limits, derivatives, *and* integrals — you only have time to teach them one or two of these. Moreover, the history department requires that you teach them integrals, as a bare minimum. This means you must skip over limits or derivatives, or both.

Your assignment is to determine which one you would skip, or if you would skip both (this is your *thesis statement*). Throughout the remainder of your paper, you should support your thesis statement by describing why you made this decision.

The following may help you get started. You do not need to answer these questions in your paper, but you can and should if they are relevant.

- Look at the definition of *derivative* and note that it involves a *limit*<sup>1</sup>. If you choose to skip limits, how would you define the derivative? Using your definition, how would you explain to the students that the derivative of  $x^2$  is  $2x$  or that the derivative of  $e^x$  is  $e^x$ ?
- If you choose to skip derivatives, how would you introduce integrals? Would you discuss anti-derivatives (indefinite integrals), or only definite integrals? How would you tell the students to determine the area of the graph under  $f(x) = x^2$  from  $x = 0$  to  $x = 1$ ?
- In your opinion, does the topic you chose capture the heart of calculus more than the one(s) you skipped? If so, why? If not, then explain why it is necessary for you to skip over material that is more important than material you cover.

Your paper should be typed or neatly written. There are no page or word count requirements. You should treat this assignment as you would a writing assignment in any other class. You will be assessed on the extent to which your paper supports your thesis statement. You should also be mindful of spelling/grammar. Finally, you may assume I am the target audience for the paper (though the history majors are the audience when you teach the class).

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<sup>1</sup>Any first semester calculus book will have this definition. For example, see Marsden and Weinstein's *Calculus I* p. 70.